

EDITORIAL ARTICLES.

BERGMANN ON THE SURGICAL TREATMENT OF DISEASES OF THE BRAIN.

The first edition of Prof. von Bergmann's work on the Surgical Treatment of Diseases of the Brain, being a contribution from his Berlin Klinik in 1887, was reviewed in the ANNALS OF SURGERY, of April, 1888. In that edition the subject of deep cerebral abscesses, tumors and epilepsy alone received attention. In a second edition, issued in 1889, from the press of Hirschwald, of Berlin, two new chapters are added, dealing with congenital diseases of the brain, and intracranial pressure. These chapters are reviewed at length by Dr. SALZER, in *Wiener klin. Wochenschrift*, 1889, II, Nos. 40 and 41, from which we take the following:

The operative treatment of encephalocele.—Bergmann opposes the nearly general view of the more favorable prognosis in the operative treatment of meningocele compared with that of encephalocele. First presenting the pathologico anatomical characteristics of the sincipital forms of cephaloceles (1, naso-frontal; 2, ethmoidal; 3, naso orbital) and proving that hydrancephalocele and cenencephalocele are more frequent than pure meningocele, he treats especially of cenencephalocele, for which he had very successfully operated in one case. These constitute the largest number of these tumors on the forehead, are of small size with a broad base or only indistinctly pediculated, feel lax, at least not tense, to the touch, are mostly pulsating and become tender on the child's crying. The skin, covering them, is frequently cicatricial and teleangiectatic.

Operation is especially justifiable, as children with sincipital encephalocele live longer, on an average, than those with occipital ones, and, on the other hand the thinness of the general covering of the enceph-

alocele very much endangers the condition of the patient. This class of encephalocele are all laterally situated, and only in a large osseous interspace is a median position simulated. The protruding brain-substance always belongs to the extremitas frontalis of the corresponding hemisphere; that is, to a region which may be lost without producing any ill effects on the functions of the brain. On the basis of his investigations Bergmann advocates a radical operation, especially for sincipital encephalocele, by means of the extirpation of the entire protruding sac together with its contents. He believes that cenencephalocele offers a better prognosis than hydrencephalocele, as just with the latter the danger of a hydrocephalus internus is much greater.

As to the different varieties of occipital encephalocele, operative aid is only to be thought of in pure meningocele and the laterally situated occipital encephalocele. These superior occipital cephaloceles probably have a course of development similar to that of the sincipital varieties, and only as a distinction from those may, more frequently, be hydrencephaloceles and thus on account of the danger of the increasing hydrocephalus yield a more unfavorable prognosis. They may become especially dangerous to the patient also for the reason of the dura mater being often lacking over them (de Ruyter) and as the angiomatous skin adheres directly to the arachnoid and pia mater, which also explains the importance of even the slightest injury.

The opening of deep cerebral abscesses is treated in the second chapter. In this Bergmann again emphasizes his conviction that deep cerebral abscesses always will have a lethal issue, by breaking through into the ventricular or meningeal spaces and, therefore, they must be evacuated. The diagnosis is especially supported by the knowledge of the ætiology of cerebral abscesses (open wounds in the skull, other suppurative processes within the skull, chiefly diseases of the ear, metastatic and tuberculous abscesses of the brain). He speaks this time especially against the occurrence of idiopathic abscesses of the brain.

In speaking of the difficulties connected with the diagnosis of metastatic and tuberculous cerebral abscesses, a recent case operated upon by Drummond is quoted, in which the metastatic abscess had developed in the middle frontal convolution after a pulmonary affec-

tion. Bergmann thinks that tuberculous abscesses of the brain are not radically curable, because the tuberculously diseased walls of the abscess can not be removed. He believes operation to be successful only in abscesses caused by traumatism, suppurative processes of the ear, or such of the bones of the head.

In the consideration of the diagnosis of the ætiologically different abscesses he emphasizes, especially in regard to abscesses following affections of the ear, that attention must be paid to the chronicity of the preceding disease, but at the same time he calls attention to the fact that they may also occur after acute suppurative processes of the middle ear.

In regard to the development of cerebral abscesses after suppuration of bone the author mentions as a favorable factor for this process pachymeningitis externa purulenta, which process is observed from extension by continuity of suppuration of bone into the cranial cavity. In the consideration of the fact, that also in such cases (as in otitis media) the abscesses are found within the white substance, separated from the ear by layers of healthy brain-tissue, he presents the following hypothesis for the explanation of the development of isolated cerebral abscesses: the extension of pus along a sinus leads to its thrombosis, and the thrombus in the sinus to organization; in the small veins of the brain the thrombus undergoes necrosis and thus a periphlebitic intra-cerebral abscess is formed.

The clinical cases speak for the frequent occurrence of abscesses in the temporal lobe in affections of the upper surface of the petrous portion of the temporal bone, and for abscesses of the cerebellum in suppuration of the mastoid process, which circumstance will also form a support for localization.

Everything which aids stagnation of inflammatory products in ear affections, especially of the upper part of the cavum tympani, favors also the breaking through of pus into the dural space, as well as the appearance of leptomeningitis purulenta, the formation of thrombosis of the sinuses and deep cerebral abscesses.

In considering cerebral abscesses the following divisions are made:

1. The symptoms of the suppuration itself.
2. The symptoms of the increased intra-cranial pressure.
3. The symptoms of the focus.

Bergmann quotes a new example of an operatively cured cerebral abscess, after long-lasting suppuration and retention of pus at the place of fracture of the left parietal bone (case of Morini Vicenzio, 1887). Abscesses which have developed without symptoms have been several times operated upon too late, *i. e.*, after penetration into the lateral ventricles had taken place; even here temporary improvement of the general state has been observed. A case observed in 1888 in the Berlin clinic illustrates distinctly how quickly in abscesses of the temporal lobe the latent stage passes into the terminal stage.

Of the 8 cases of deep abscess of the brain, which have been operated on successfully, Bergmann mentions first his own very typical observation:

October 14, 1888.—A man, *æt.* 29 years, had suffered for a year from a purulent discharge from the right ear; during the last three weeks he also had suffered from vertigo and staggering gait, and within the last four days violent headaches, chiefly right-sided, set in. High fever (39.5° C.) was present, the quantity of the discharge at the same time diminishing. No signs of inflammation could be discovered around the mastoid process, but the superior wall of the auditory canal was swollen in its posterior portion and pus retained in the upper part of the tympanic cavity. The pain was increased by percussion of the temporal lobe above the concha. The exhaustion and torpidity of the patient, together with striking decrease of the pulse (44 per minute), besides the above mentioned symptoms, indicated increased pressure upon the brain.

Disturbances of motility and sensibility in the left upper extremity were especially signs of increased pressure in the neighborhood of the temporal lobe.

Diagnosis: Abscess in the temporal lobe. Operation was decided upon without hesitation.

For limiting the field, within which the cranium should be opened to expose an abscess of the temporal lobe, Bergmann gives the following rules:

A line is drawn about 5 cm. above the arcus zygomaticus parallel to it, the arch being easily felt in the living subject. The upper border

having been thus marked out, the posterior may be found in a similarly simple way. A basal line is drawn, *i. e.*, a line connecting the lower border of the orbit with the tuber occipitale, as well as a vertical one to the sagittal suture, which should take its origin from the posterior border of the mastoid process; this represents the desired posterior border. The anterior corresponds to a line running parallel to it through the inferior maxillary articulation. Now, care is to be taken that the lower border of the perforation in trephining be kept at a distance of at least one cm. from the root of the zygomatic arch, which runs over the meatus auditorius externus.

The author trephined in this case above the posterior border at the base of the processus mastoideus, struck at first healthy dura mater and then cedematous brain substance. "The knife was thrust in three times before it reached the abscess, which was situated anteriorly to the incision. A greenish-yellowish, fetid pus was evacuated. The quantity of it amounted to about 30 c. cm. Digital examination revealed a cavity with smooth walls, surrounded on all sides by soft masses. Iodoform-ether was carefully, and with the slightest pressure, injected into the cavity, and then a drainage tube was inserted 4 cm. into the wound. Around the drainage tube the cerebral wound was loosely packed with iodoform gauze, which was also put into the bone-wound, as well as into that of the soft parts."

The fever decreased, the pulse rose and the headache also disappeared immediately after the operation. The patient was cured after six weeks, except the secretion from the ear. For the latter he was again operated on in December, and made a perfect recovery.

The histories of 7 other deep cerebral abscesses which have been cured are quoted (Schede, 1; Barker, 2; Greenfield, 1; Macewen, 2; Horsley, 1;). Of special interest is the case of Horsley, as it presented very alarming symptoms. Horsley operated on the patient (male, *æt.* 45 years), evacuated the abscess, and three weeks after the operation the patient was cured in every respect.

In regard to these 8 cases, Bergmann emphasizes the symptom of the early constant "raging headache," with localization by means of percussion above the upper border of the concha, as well as combina-

tion of the symptoms in order to localize the abscess. He also calls attention to the vacillation in the intensity of the symptoms, the fever and cerebral pressure.

"The lower extremities were never involved in the corresponding cases, which shows that the lower portions of the central convolutions were affected. That is the fact which indicates a compressive and narrowing disturbance extending from below upward, an unequal conduction of the pressure through the solid mass of the brain, which influenced the structures near the abscess in the temporal lobe more than the more remote ones. In collection of pus between the bony skull and the dura mater the mentioned general and limited phenomena of pressure have not been observed."

As examples of such successfully operated cases the author mentions those of Schondorff, Hoffman and Ceci. The case of Ceci, the only example of successful opening of the cranium in cerebellar abscess, shows the interesting symptom of disturbance of locomotion, viz., the patient staggered like a drunken man, and in walking had to support himself by the wall. The abscess was situated closely to the wall of the sinus transversus.

"A large number of the extra dural abscesses in the cranium are undoubtedly of a periphrlebitic origin. This should, however, be no reason for failing to evacuate them. We possess, on the contrary, a number of reliable communications, from which we can see that thrombosis of the sinus transversus has been rendered innocuous by removal of the pus, which had rested against the vein." In speaking of the technique of trephining, Bergmann accepts the proposition of Baker, *i. e.*, the exposure of the emissarium in the sutura occipito mastoidea, if any doubt as to the location of the abscess be present, for suppuration near the anastomosing vein indicates a suppurative process in the posterior cranial fossa. He advocates the use of the knife instead of the exploring needle, demonstrating the safety of simple incision of the brain substance, as has been shown by experiments and clinical experience.

At the end of the chapter the author considers the prophylactic treatment of cerebral abscesses, more especially that of suppurative

processes of the ear, warning energetically against the too frequently practiced injections in modern aural therapeutics, and recommends instead drainage and rest. The procedure for erosion and securing of sufficient drainage recommended by him is as follows: A crescentic incision is made around the external ear, concentric to the antihelix, but $\frac{3}{4}$ -in. removed from it. The incision is carried down to the external surface and mastoid portion of the temporal bone. The periosteum is pushed upward and backward toward the external auditory canal in such a way as to entirely expose the edges of the canal. Closely beneath the transverse ridge of the root of the processus zygomaticus chips of bone are carefully cut off with a sharp chisel, until by removal of the superior and posterior wall, a funnel-shaped opening is formed, which would admit a finger into the tympanic cavity.

3. *Operative treatment of tumors of the brain.*—Two varieties of cerebral tumors are to be distinguished: 1, circumscribed, and 2, infiltrated tumors. The successful extirpation of tumors having their origin in the roof of the cranium has proved that large pieces of the cranium may be removed without ill consequences; moreover, if the defect be immediately repaired by dermoplasty. Syphiloma of the brain should never be treated operatively, even if it excites all the phenomena of a cerebral tumor, because, first, internal therapy is sufficient, and second, even extirpation of the resulting scar after disappearance of the syphilitic manifestations, does, probably, not yield a more favorable condition on the surface of the brain.

Macewen extirpated successfully a tumor (in a case of brachio-cranial hæmiplegia), which, probably, is to be regarded as a syphiloma of the cortex.

Tuberculoma is not a favorable object for surgical treatment, on account of its rare occurrence as a primary tuberculous focus and also because a radical cure seems only attainable by extensive excision in an otherwise healthy subject. Of the four cases of extirpation of localized cerebral tuberculosis, two of them, operated upon by Horsley and Macewen, were, however, cured. In both of these cases the tuberculous process in the cerebral cortex had excited cortical epilepsy. Horsley, who performed extirpation in a subject otherwise healthy, ob-

served in his patient permanent paralysis of the fingers. Macewen, who did not remove the tubercle of the pia mater, but only enucleated the tubercle found in the central convolution (the tubercle having the size of a hazelnut), does not report any paralytic phenomena. The two fatal cases of tuberculosis of the cerebellum, on the other hand, illustrate the difficulties presented in successful operation for evacuation of tuberculous masses from the brain.

The analysis of White's cases results in that among 100 tumors of the brain only 9 are operable; but these are mostly of slight clinical importance, because diagnosis is only possible if they are situated in the motor region, or in the occipital or temporal lobe, and of a certain size. Infiltrated tumors should not be extirpated, as the outlines cannot be distinguished. Large cerebral tumors should also not be removed, on account of the alarming hæmorrhage, which is likely to follow and difficult to check, and the development of extensive œdema of the brain. Macewen and Durante extirpated successfully one tumor each, which had compressed the frontal lobe.

Tumors of the brain-substance, which were diagnosticated only from the cerebral symptoms, were extirpated by Bennett and Godlee (1884), Hirschfelder (1885), Horsley (1886, each tumor weighing $4\frac{1}{2}$ ounces), Keen (1887), Seguin and Weir (1887); of these, three cases had remained well, at least three months after the operation. The cases in which operation was performed under false diagnosis, or those in which the tumor was not found at all, or where the operation could not be carried out on account of the large size of the tumor or complicating adhesions, are not enumerated. Bergmann operated once under false diagnosis, a cyst, the residue of an apoplectic focus, being in question. The patient died four weeks after the operation from leptomeningitis.

The author is of the opinion that operation for tumors of the brain is to be limited to a few cases where the diagnosis can be made with certainty.

4. *The cure of epilepsy by trepanation.*—"The present statistics on the success of trepanation in the treatment of this disease are valueless, as the cure of the wound caused by the operation is only mentioned, and not the cure of epilepsy, thus not considering the essential

feature of this therapeutic measure. The reason of this is chiefly to be sought for in the premature publications of the different operators "

Bergmann obtained a successful cure of reflex-epilepsy in one case by extirpating a scar on the thigh. Cases of epilepsy, which follow head-injuries, are not to be taken in general, as reflex epilepsy, even if it may occur frequently, simply because in non-fatal injuries of the head epilepsy occurs in 0.57% of the cases, while, on the other hand, in injuries of the neck, trunk and extremity together, epilepsy occurs only in 0.076% of the cases.

Traumatic epilepsy after injuries of the head is undoubtedly to be regarded, as a rule, as cortical epilepsy, and appears frequently as a distinct picture of Jacksonian epilepsy.

Horsley, led by the conviction that the pathological process, which especially gives rise to the epilepsy, is to be sought for in the cortex, extirpated that part of the latter which was diagnosed as being diseased, from the symptoms presenting themselves in a patient. He really found a pathological change in the extirpated portion of the cortex and also cured the epilepsy.

Horsley further removed in three other cases portions of the cortex with the scar or traumatic cyst beneath the dura, and, in latter years, analogous operations have been successfully performed by others.

The successful excision of portions of the cortex in traumatic epilepsy led to the excision of areas of the cortex in non-traumatic cases, in which the epilepsy could be located. But in Bergmann's case, as well as in that of Horsley, who had extirpated a certain psycho motor centre, the character of the epilepsy was not essentially influenced. The success in the recent case of Keen is also to be regarded as incomplete.

Operation for epileptiform attacks of vertigo and periodically occurring mental disturbances, appearing after traumatism, should not be performed on account of the absence of localization of the disturbance.

Bergmann emphasizes the difference and distinction between those cases which present a complete and pure picture of traumatic cortical epilepsy and those which do not present the essential characteristics of this affection. He then gives, in extenso, the different groups of

symptoms which characterize each of these affections, and concludes by saying: "We should endeavor to give our surgical aid only to cases of pure traumatic cortical epilepsy."

5. *Puncture of the ventricles and operations for removal of pressure.*—After mentioning the rare case of Ceci, in which (a case of pachymeningitis chronica hæmorrhagica) the latter trephined successfully, and that in which Bergmann himself operated, on account of fixed and distinctly located headache, and where he effected a cure by removal of a blood extravasation, located beneath the extremely thin vault of the skull, he treats of the influence of operation upon increased cerebral pressure in tumors of the brain, as well as in ventricular dropsy, as a sequel of tuberculous basilar meningitis.

In a case of large cerebral tumor, Heath caused, by simple trephining (extirpation of the tumor being impossible), cessation of the headaches, the epileptic attacks and disappearance of the paralysis. The tumor, which originated in the anterior fossa, and was adherent to the bone, had thus opportunity to protrude from the cranial cavity.

Bergmann doubts very much whether the intra-cranial pressure, which might be present in subdural tumors, or, moreover, in subdural blood extravasation, *e. g.*, in hæmorrhages into the substance of the brain produced by diseases of the arteries of the brain, could ever be decreased by trepanation.

The author undertook operation in a case of hydrocephalus acutus in tuberculous meningitis. While demonstrating that the immediate danger lies here in the inflammation of the plexus and its product, *i. e.*, exudation of fluid with consequent increase of the endocranial tension, he, at the same time, refers to the possibility of a favorable influence upon the tubercular process itself through the removal of the transudate, reminding one of the analogous and sometimes successful treatment of tuberculous peritonitis.

He made, in a child, *æt.* 3 years, which already was in a soporific state, and had intermittent, retarded pulse; an opening over the tuber ossis frontalis by trephining, and then inserted a long, hollow needle deeply into the brain, until the cerebro spinal fluid flowed out in a jet. After removal of the needle the defect in the skull was tamponed with

iodoform gauze. A striking improvement of the respiration and heart's action set in, and the child took food of its own accord. Exitus letalis took place on the fourth day; cerebro spinal fluid had dribbled away all the time. The immediately desired decrease of the intracranial pressure was, however, accomplished.

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